REMARKS

The following remarks are made in response to the Final Office Action mailed February 17, 2005. Claims 9, 11-12, 18-19, 22, and 24 have been cancelled. Claims 8-28 were rejected. With this Response, claims 8, 10, 15-17, 20-21, and 25-28 have been amended. Claims 8, 10, 13-17, 20-21, 23, and 25-29 remain pending in the application and are presented for reconsideration and allowance.

Claim Rejections under 35 U.S.C. § 102

In the Office Action, claim 8 was rejected under 35 U.S.C. § 102(e) as being anticipated by Frutschy U.S. Patent No. 6,750,551.

The Frutschy Patent fails to disclose Applicant's amended independent claim 8 directed to an electronic component system. In particular, the Frutschy Patent fails to disclose the system comprising, among other things, an integrated circuit package including a substrate having a solder column array connecting the integrated circuit package directly to the printed circuit board.

Instead, the Frutschy Patent discloses an interposer substrate 124 interposed between a microelectronic device 102 and a carrier substrate 132, including solder balls 134 between the interposer 124 and carrier substrate 132. In contrast, Applicant's claimed system includes a solder column array directly connecting the substrate of the integrated circuit package to the printed circuit board.

In further contrast to the Frutschy Patent, Applicant's claimed system comprises, among other things, a lid that extends directly from the substrate with the lid including an extended portion that extends outwardly over an edge of the substrate. Instead, the Frutschy Patent disloses a heat slug 122 in contact with the microelectronic device 132 and which is not sized or shaped to enable spacer 158 to fit underneath any portion of heat slug 122. The thermal plate 148 in the Frutschy Patent is not in direct contact with microelectronic device 132. Accordingly, the Frutschy Patent fails to disclose a lid that extends directly from the substrate of an integrated circuit package with the lid including an extended portion that extends outwardly over an edge of the substrate, as claimed by Applicant.

In further contrast to Applicant's claimed system, the Frutschy Patent also fails to disclose a plurality of supports with each support disposed at each corner of integrated circuit package underneath a lid of the integrated circuit package. Instead, spacers 158 of Frutschy (Fig. 1) are not illustrated nor described as being located at each corner of microelectronic device 132.

In further contrast, the Frutschy Patent fails to disclose Applicant's claimed system comprising, among other things, each support sized and shaped to enable a gap between the extended portion of the lid of the integrated circuit package and the supports in a first assembled state of the system, and to enable contact between the extended portion of the lid of the integrated circuit package and the supports without the gap in a second assembled state of the system, wherein a compressive force mechanism applies a compressive force on the integrated circuit package against the printed circuit board **in both** the first assembled state of the system and the second assembled state of the system. The compressive force is translated through only the solder column array in the first assembled state of the system and translated through both the solder column array and the supports via the extended portion of the lid in the second assembled state of the system.

Instead, the Frutschy Patent, as applied in the Office Action does not include a compressive load in its first state of assembly which is "prior to [the] screw step" (cited from page 4 of Office Action), and therefore fails to disclose Applicant's claimed system in which a compressive force is applied on the integrated circuit package against the printed circuit board **in both** the first assembled state of the system and the second assembled state of the system.

Moreover, in further contrast to Applicant's claimed system, the Frutschy Patent fails to disclose that each support includes a body and a pair of wings extending from the body to be substantially perpendicular to each other for contacting the edges of the substrate of the integrated circuit package, the support sized and shaped to cause the wings to be underneath and in contact with the extended portion of the lid in the second assembled state of the system and the body sized and shaped to extend outwardly in a direction generally opposite from the wings to be exposed relative to, and not in contact with the extended portion of the lid.

Instead, the Frutschy Patent is silent regarding the shape of its spacers 158 and therefore does not disclose the above identified features (e.g., wings, body, position, shape, etc.) of the supports of Applicant's claimed system.

In further contrast, the Frutschy Patent fails to disclose Applicant's claimed system comprising, among other things, a heat sink mounted on top of the lid of the integrated circuit package, the lid being separable from and independent of the heat sink, with the heat sink being removably secured relative to the integrated circuit package via the compressive force.

Instead, the Frutschy Patent discloses only thermal plate 148 as part of support structure 142 and heat slug 122, and does not disclose a heat sink, and therefore does not disclose a lid of an integrated circuit package that is independent of a heat sink, as claimed by Applicants.

For these reasons, the Frutschy Patent fails to teach or suggest amended independent claim 8, and therefore Applicant's amended independent claim 8 is patentable and allowable over the Frutschy Patent. In addition, dependent claims 10, 13-14, 21, 23, and 25 are also believed to be allowable as they further define patentably distinct independent claim 8.

In the Office Action, claims 8-12, 14, 17-19, and 28 were rejected under 35 U.S.C. § 102(e) as being anticipated by Dai et al., U.S. Publication No. 2004/0134680.

The Dai Publication fails to disclose Applicant's claimed electronic component system of independent claim 8. In particular, the Dai Publication fails to disclose that each support of a system includes a body and a pair of wings extending from the body to be substantially perpendicular to each other for contacting the edges of the substrate of the integrated circuit package, the support sized and shaped to cause the wings to be underneath and in contact with the extended portion of the lid in the second assembled state of the system and the body sized and shaped to extend outwardly in a direction generally opposite from the wings to be exposed relative to, and not in contact with the extended portion of the lid, as claimed by Applicant.

Instead, the Dai Publication discloses stops 20 which do not have the claimed configuration (e.g., wings, body, relative shape, etc.) of the supports specified in Applicant's claimed system.

In further contrast to the Dai Publication, Applicant's claimed system comprises, among other things, a lid that extends directly from the substrate with the lid including an extended portion that extends outwardly over an edge of the substrate. Instead, the Figures in the Dai Publication discloses a footprint (e.g., width and length) of chip 16 that is smaller than a footprint of substrate 14. Therefore, as illustrated in Figures 1-4 of the Dai Publication, the stops 20 do not contact and support chip 16 because stops 20 directly contact and support substrate 14.

The supports in Applicant's claimed system are underneath and in contact an extended portion of a lid of an integrated circuit package (in a second assembled state of the system) that extends outwardly over an edge of the substrate. The extended portion of the lid enables a majority of the applied compressive force to be translated through the supports (after a desired amount of creep has occurred in the solder column array and the gap has closed) in the solder column array along a generally parallel path to the solder column array, apart from the substrate itself.

Accordingly, the Dai Publication fails to disclose a lid that extends directly from the substrate of an integrated circuit package with the lid including an extended portion that extends outwardly over an edge of the substrate, as claimed by Applicant, **and** the Dai Publication also fails to disclose supports that are positioned underneath, and in contact with the extended portion of the lid in a second assembled state of the system, as claimed by Applicant.

For these reasons, the Dai Publication fails to teach or suggest amended independent claim 8, and therefore Applicant's amended independent claim 8 is patentable and allowable over the Dai Publication. In addition, dependent claims 10, 13-14, 21, 23, and 25 are also believed to be allowable as they further define patentably distinct independent claim 8.

For substantially the same reasons presented for the patentability of claim 8, and for additional reasons, the Dai Publication fails to disclose Applicant's claim 28. First, as previously presented, the Dai Publication fails to disclose Applicant's claimed system comprising, among other things, a lid that extends directly from the substrate of an integrated circuit package with the lid including an extended portion that extends outwardly over an edge of the substrate, as claimed by Applicant.

In further contrast to the Dai Publication, Applicant's amended independent claim 28 specifies that, among other things, each support comprises a pair of wing portions that are generally perpendicular to each other and joined together at one end to define a corner, and each of the wing portions of the supports are underneath and in contact with the extended portion of the lid of the integrated circuit package in the second assembled state of the system.

Instead, the Dai Publication discloses stops 20 which do not explicitly have the claimed configuration (e.g., wings in a generally perpendicular arrangement) of the supports specified in Applicant's claimed system.

In further contrast to the Dai Publication, Applicant's claimed system comprises, among other things, a single band sized and shaped to surround and contact all of the supports and apply a lateral force against the wing portions and the corner of the supports to secure the supports in position underneath the extended portion of lid of the integrated circuit package and to maintain the supports in position relative to the printed circuit board.

Instead, the Dai Publication discloses other mechanisms for securing stops 20 relative to a board 18 or substrate 14 (see the Dai Publication at Paragraph 24) but does not explicitly disclose the features of the single band that applies a lateral force to maintain the supports in proper contact and position, as claimed by Applicant.

For these reasons, the Dai Publication fails to teach or suggest amended independent claim 28, and therefore Applicant's amended independent claim 28 is patentable and allowable over the Dai Publication. Dependent claim 29 is also believed to be allowable as it further defines patentably distinct independent claim 28.

For substantially the same reasons presented for the patentability of claims 8 and 28, the Dai Publication fails to disclose Applicant's independent claim 17. First, the Dai Publication fails to disclose a support as a shim including a body and a pair of wings extending from the body to be substantially perpendicular to each other for contacting the edges of the substrate of the integrated circuit package, wherein the shim is sized and shaped to cause the wings to be underneath and in contact with the lid, and the body of the shim being sized and shaped to extend outwardly in a direction generally opposite from the wings to be exposed relative to, and not in contact with the lid.

Second, the Dai Publication also fails to disclose a support comprising: (1) a shim including a pair of wing portions that are generally perpendicular to each other and joined together at one end to define a corner, and wherein the wing portions of the shim are in contact with and support the lid of the integrated circuit package in an assembled state of the system; and (2) a single band sized and shaped to surround and contact the shim and apply a lateral force against the wing portions and the corner of the shim to secure the shim in position underneath the lid of the integrated circuit package and to maintain the shim in position relative to the printed circuit board.

As previously explained in association with claim 8 and claim 28, respectively, the Dai Publication fails to disclose these features, each of which are specified in Applicant's amended independent claim 17.

For these reasons, the Dai Publication fails to teach or suggest amended independent claim 17, and therefore Applicant's amended independent claim 17 is patentable and allowable over the Dai Publication. Dependent claim 20 is also believed to be allowable as it further defines patentably distinct independent claim 17.

In the Office Action, claims 15, 16, and 26 were rejected under 35 U.S.C. § 102(b) as being anticipated by Blanton U.S. Patent No. 5,220,200.

The Blanton Patent fails to disclose Applicant's amended independent claim 15 directed to an electronic component system.

First, the pillars 50 in the Blanton Patent are permanent parts of the arrangement (Column 8, lines 19-32) formed at the same time the circuit components are formed (Column 3, lines 56-57). Accordingly, pillars 50 are not removably attachable relative to substrate 30 (Figure 2), whereas in Applicant's claimed system, the support means for mechanically connecting is removably attachable to the means for carrying circuit components, as claimed by Applicant.

In further contrast to the Blanton Patent, in Applicant's claimed system, the means for performing circuit functions includes, among other things, a second means disposed on top of a substrate and extending from the substrate outwardly beyond the substrate for translating a compressive load to a means for carrying circuit components, as specified in claim 15. The Blanton Patent does not include a structure or function corresponding second means for

translating as the chip 10 (that carries solder balls 20) in the Blanton Patent is the only contact with pillars 50.

For these reasons, the Blanton Patent fails to teach or suggest amended independent claim 15, and therefore Applicant's amended independent claim 15 is patentable and allowable over the Blanton Patent. Dependent claims 16 and 26 are also believed to be allowable as they further define patentably distinct independent claim 15.

In light of the above, Applicants respectfully request withdrawal of the rejection of claims 8, 10, 14-19, 26 and 28 based on the Dai Publication, the Blanton Patent, and/or the Frutschy Patent, respectively, under 35 U.S.C. §102.

Claim Rejections under 35 U.S.C. § 103

In the Office Action, claims 13, 20, and 22 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Dai et al. as applied to claims 8 and 17 and further in combination Chuang et al., U.S. Publication No. 2004/0036162.

First, dependent claim 22 has been canceled so the rejection of claim 22 is now moot.

Second, dependent claim 13 is believed to be allowable over the Dai Publication and the Chuang Publication because claim 13 further defines patentably distinct independent claim 8, which is patentable and allowable over the Dai Publication for the reasons previously presented. Moreover, the Chuang Publication fails to cure the deficiencies of the Dai Publication regarding independent claim 8, from which claim 13 depends.

Third, dependent claim 20 is believed to be allowable over the Dai Publication and the Chuang Publication because claim 20 further defines patentably distinct independent claim 17, which is patentable and allowable over the Dai Publication for the reasons previously presented. Moreover, the Chuang Publication fails to cure the deficiencies of the Dai Publication regarding independent claim 17, from which claim 20 depends.

For these reasons, the Dai Publication and the Chuang Publication, alone or in combination, fail to teach or suggest dependent claims 13 and 20, and therefore Applicant's amended dependent claims 13 and 20 are patentable and allowable over the Dai Publication and the Chuang Publication as they further define patentably distinct independent claims 8 and 17, respectively.

In the Office Action, claims 21, 23, and 24 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Dai et al, as applied to claims 8, 11, and 13 and further in combination with the Frutschy Patent.

First, dependent claim 24 has been cancelled so the rejection of claim 24 is now moot.

Second, dependent claims 21 and 23 are believed to be allowable over the Dai Publication and the Frutschy Patent because claims 21 and 23 further define patentably distinct independent claim 8, which is patentable and allowable over the Dai Publication or the Frutschy Patent for the reasons previously presented. Moreover, the Frutschy Patent fails to cure the deficiencies of the Dai Publication, and vice versa, regarding independent claim 8, from which claims 21 and 23 depend.

Third, the Frutschy Patent additionally fails to cure the deficiencies of the Dai Publication regarding Applicant's independent claim 21 because in the Frutschy Patent, the fastener 152 that extends through board 132 does not extend into a support, whereas a fastener extends through a printed circuit board and then into the supports (in the body of the support) in Applicant's claim 21. In fact, in Figure 1 of the Frutschy Patent, fastener 152 does not even extend into spacers 158, which were alleged to be equivalent to Applicant's claimed supports in the Office Action (in the rejection of Applicant's independent claim 8).

For these reasons, the Dai Publication and the Frutschy Patent, alone or in combination, fail to teach or suggest dependent claims 21 and 23,and therefore Applicant's amended dependent claims 21 and 23 are patentable and allowable over the Dai Publication and the Frutschy Patent as claims 21 and 23 further define patentably distinct independent claim 8.

In the Office Action, claim 25 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Dai et al., as applied to claim 8, and further in combination Khiang U.S. Publication No. 2004/0012079.

Dependent claim 25 is believed to be allowable over the Dai Publication and the Khiang Publication because claim 25 further defines patentably distinct independent claim 8, which is patentable and allowable over the Dai Publication for the reasons previously

presented. Moreover, the Khiang Publication fails to cure the deficiencies of the Dai Publication regarding independent claim 8, from which claim 25 depends.

For these reasons, the Dai Publication and the Khiang Publication, alone or in combination, fail to teach or suggest dependent claim 25, and therefore Applicant's amended dependent claim 25 is patentable and allowable over the Dai Publication and the Khiang Publication allowable as they further define patentably distinct independent claim 8.

In the Office Action, claim 27 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Blanton et al., as applied to claim 26, and further in combination with Dai et al.

Dependent claim 27 is believed to be allowable over the Blanton Patent and the Dai Publication because claim 27 further defines patentably distinct independent claim 15 (and intervening dependent claim 26), which is patentable and allowable over the Blanton Patent for the reasons previously presented. Moreover, the Dai Publication fails to cure the deficiencies of the Blanton Patent regarding independent claim 15, from which claim 27 depends.

For these reasons, the Blanton Patent and the Dai Publication, alone or in combination, fail to teach or suggest dependent claim 27, and therefore Applicant's amended dependent claim 27 is patentable and allowable over the Blanton Patent and the Dai Publication allowable as claim 27 further defines patentably distinct independent claim 15.

In light of the above, Applicants respectfully request withdrawal of the rejection of claims 13, 20-21, 23, 25, and 27 based on the Dai Publication, the Blanton Patent, the Khiang Patent, the Frutschy Patent, and/or the Chuang Publication, respectively, under 35 U.S.C. §103.

CONCLUSION

In view of the above, Applicant respectfully submits that pending claims 8, 10, 13-17, 20-21, 23, 25, and 26-29 are in form for allowance and are not taught or suggested by the cited references. Therefore, reconsideration and withdrawal of the rejections and allowance of claims 8, 10, 13-17, 20-21, 23, 25, and 26-29 is respectfully requested.

No fees are required under 37 C.F.R. 1.16(b)(c). However, if such fees are required, the Patent Office is hereby authorized to charge Deposit Account No. 08-2025.

The Examiner is invited to contact the Applicant's representative at the below-listed telephone numbers to facilitate prosecution of this application.

Any inquiry regarding this Amendment and Response should be directed to either David A. Plettner at Telephone No. (408) 447-3013, Facsimile No. (408) 447-0854 or Paul S. Grunzweig at Telephone No. (612) 767-2504, Facsimile No. (612) 573-2005. In addition, all correspondence should continue to be directed to the following address:

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CERTIFICATE UNDER 37 C.F.R. 1.8: The undersigned hereby certifies that this paper or papers, as described herein, are being deposited in the United States Postal Service, as first class mail, in an envelope address to: Mail Stop AF, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on this 14th day of April, 2005.

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